Amendments to the Claims

Please cancel claims 62-1690 without prejudice.

The following listing of claims will replace all prior versions and/or listings of claims in the application:

Listing of Claims:

1. (original): A method for forming at least one opening in a geological formation, comprising:

forming a portion of an opening in the formation;

providing an acoustic wave to at least a portion of the formation, wherein the acoustic wave is configured to propagate between at least one geological discontinuity of the formation and at least a portion of the opening;

sensing at least one reflection of the acoustic wave in at least a portion of the opening;

using the sensed reflection to assess an approximate location of at least a portion of the opening in the formation; and

forming an additional portion of the opening based on, at least in part, the assessed approximate location of at least a portion of the opening.

2. (original): The method of claim 1, further comprising using the sensed reflection to maintain an approximate desired location of the opening between an overburden of the formation and an underburden of the formation.

3. (original): The method of claim 1, wherein at least one geological discontinuity comprises a boundary of the formation.

4. (original): The method of claim 1, further comprising using the sensed reflection to maintain the location of the opening at approximately midway between an overburden of the formation and an underburden of the formation.

5. (original): The method of claim 1, further comprising producing the acoustic wave using a monopole source or a dipole source.

6. (original): The method of claim 1, further comprising sensing the reflection of the acoustic wave using one or more sensors in at least a portion of the opening.

7. (original): The method of claim 1, further comprising producing the acoustic wave using a source for producing the acoustic wave in at least a portion of the opening.

8. (original): The method of claim 1, further comprising producing the acoustic wave using a source for producing the acoustic wave in at least a portion of the opening, and sensing the acoustic wave using one or more sensors in at least a portion of the opening.

9. (original): The method of claim 1, further comprising sensing the reflection of the acoustic wave during formation of at least a portion of the opening in the formation.

10. (original): The method of claim 1, further comprising using a calculated or assessed acoustic velocity in the formation when using the sensed reflection to assess the location of the opening in the formation.

11. (original): The method of claim 1, further comprising propagating an acoustic wave between an overburden of the formation and the opening.

12. (original): The method of claim 1, further comprising propagating an acoustic wave between an underburden of the formation and the opening.

13. (original): The method of claim 1, further comprising propagating an acoustic wave between an overburden of the formation and the opening, and an underburden of the formation and the opening.

14. (original): The method of claim 1, further comprising using information from the sensed acoustic wave to, at least in part, guide a drilling system in forming the opening.

15. (original): The method of claim 1, further comprising substantially simultaneously providing acoustic waves, sensing reflected acoustic waves, and using information from the sensed acoustic waves to, at least in part, guide a drilling system in forming the opening.

16. (original): The method of claim 1, further comprising using information from the sensed acoustic wave to, at least in part, substantially simultaneously guide a drilling system in forming the opening.

17. (original): The method of claim 1, further comprising using information from the sensed acoustic wave to assess a location of at least a part of the opening, and then using such assessed location to, at least in part, guide a drilling system in forming the opening.

18. (original): The method of claim 1, further comprising using information from the sensed acoustic waves to assess locations of parts of the opening, and then using such assessed locations to, at least in part, guide a drilling system in forming the opening.

19. (original): The method of claim 1, wherein a first opening is formed using the sensed acoustic wave, and further comprising forming one or more additional openings by using magnetic tracking to form at least one of the additional openings at a selected approximate distance from the first opening.

20. (original): The method of claim 1, further comprising assessing an approximate orientation of the opening with an inclinometer.

21. (original): The method of claim 1, further comprising assessing an approximate location of the opening relative to a second opening in the formation by detecting one or more magnetic fields produced from the second opening.

22. (original): The method of claim 1, further comprising assessing an approximate location of the opening relative to a second opening in the formation by detecting one or more magnetic fields produced from the second opening with a magnetometer.

23. (original): The method of claim 1, further comprising assessing an approximate location of the opening relative to a second opening in the formation by detecting one or more magnetic fields produced from the second opening so that the opening is formed at an approximate desired distance from the second opening.

24. (original): The method of claim 1, wherein at least a portion of the formation comprises hydrocarbons, the method further comprising heating at least a portion of the formation and pyrolyzing at least some hydrocarbons in the formation.

25. (original): The method of claim 1, further comprising heating at least a portion of the formation, and controlling a pressure and a temperature in at least a part of the formation, wherein the pressure is controlled as a function of temperature, and/or the temperature is controlled as a function of pressure.

26. (original): The method of claim 1, further comprising heating at least a portion of the formation, and producing a mixture from the formation, wherein the produced mixture comprises condensable hydrocarbons having an API gravity of at least about 25°.

27. (original): The method of claim 1, further comprising heating at least a portion of the formation, controlling a pressure in at least a part of the formation, wherein the controlled pressure is at least about 2.0 bars absolute.

28. (original): The method of claim 1, further comprising heating at least a portion of the formation, and controlling formation conditions such that a mixture produced from the formation comprises a partial pressure of H_2 in the mixture greater than about 0.5 bars.

29. (original): The method of claim 1, further comprising heating at least a portion of the formation, and altering a pressure in the formation to inhibit production of hydrocarbons from the formation having carbon numbers greater than about 25.

30. (original): The method of claim 1, further comprising heating at least a portion of the formation to a minimum pyrolysis temperature of about 270 °C.

31. (original): A method for heating a hydrocarbon containing formation, comprising:

providing heat to the formation from one or more heaters in one or more openings in the formation, wherein at least one of the openings has been formed by:

forming a portion of an opening in the formation;

providing an acoustic wave to at least a portion of the formation, wherein the acoustic wave is configured to propagate between at least one geological discontinuity of the formation and at least a portion of the opening;

sensing at least one reflection of the acoustic wave in at least a portion of the opening; and

using the sensed reflection to assess an approximate location of at least a portion of the opening in the formation.

32. (original): The method of claim 31, wherein at least one portion of an opening has been formed based on, at least in part, the assessed approximate location of at least a portion of the opening.

33. (original): The method of claim 31, wherein at least one portion of an opening has been formed using the sensed reflection to maintain an approximate desired location of the opening between an overburden of the formation and an underburden of the formation.

34. (original): The method of claim 31, wherein at least one geological discontinuity comprises a boundary of the formation.

35. (original): The method of claim 31, wherein at least one portion of an opening has been formed based on, at least in part, using the sensed reflection to maintain the location of the opening at approximately midway between an overburden of the formation and an underburden of the formation.

36. (original): The method of claim 31, wherein at least one portion of an opening has been formed based on, at least in part, producing the acoustic wave using a monopole source or a dipole source.

37. (original): The method of claim 31, wherein at least one portion of an opening has been formed based on, at least in part, sensing the reflection of the acoustic wave using one or more sensors in at least a portion of the opening.

38. (original): The method of claim 31, wherein at least one portion of an opening has been formed based on, at least in part, producing the acoustic wave using a source for producing the acoustic wave in at least a portion of the opening.

39. (original): The method of claim 31, wherein at least one portion of an opening has been formed based on, at least in part, producing the acoustic wave using a source for producing the acoustic wave in at least a portion of the opening, and sensing the acoustic wave using one or more sensors in at least a portion of the opening.

40. (original): The method of claim 31, wherein at least one portion of an opening has been formed based on, at least in part, sensing the reflection of the acoustic wave during formation of at least a portion of the opening in the formation.

41. (original): The method of claim 31, wherein at least one portion of an opening has been formed based on, at least in part, using a calculated or assessed velocity in the formation when using the sensed reflection to assess the location of the opening in the formation.

42. (original): The method of claim 31, wherein at least one portion of an opening has been formed based on, at least in part, propagating an acoustic wave between an overburden of the formation and the opening.

43. (original): The method of claim 31, wherein at least one portion of an opening has been formed based on, at least in part, propagating an acoustic wave between an underburden of the formation and the opening.

44. (original): The method of claim 31, wherein at least one portion of an opening has been formed based on, at least in part, propagating an acoustic wave between an overburden of the formation and the opening and an underburden of the formation and the opening.

45. (original): The method of claim 31, wherein at least one portion of an opening has been formed based on, at least in part, using information from the sensed acoustic wave to, at least in part, guide a drilling system in forming the opening.

46. (original): The method of claim 31, wherein at least one portion of an opening has been formed based on, at least in part, substantially simultaneously providing acoustic waves, sensing reflected acoustic waves, and using information from the sensed acoustic waves to, at least in part, guide a drilling system in forming the opening.

47. (original): The method of claim 31, wherein at least one portion of an opening has been formed based on, at least in part, using information from the sensed acoustic wave to, at least in part, substantially simultaneously guide a drilling system in forming the opening.

48. (original): The method of claim 31, wherein at least one portion of an opening has been formed based on, at least in part, using information from the sensed acoustic wave to assess a location of at least a part of the opening, and then using such assessed location to, at least in part, guide a drilling system in forming the opening.

49. (original): The method of claim 31, wherein at least one portion of an opening has been formed based on, at least in part, using information from the sensed acoustic waves to assess locations of parts of the opening, and then using such assessed locations to, at least in part, guide a drilling system in forming the opening.

50. (original): The method of claim 31, wherein at least one portion of an opening has been formed based on, at least in part, using the sensed acoustic wave, and further comprising forming one or more additional openings by using magnetic tracking to form one or more additional openings at a selected approximate distance from the first opening.

51. (original): The method of claim 31, further comprising assessing an approximate orientation of the opening with an inclinometer.

52. (original): The method of claim 31, further comprising assessing an approximate location of the opening relative to a second opening in the formation by detecting one or more magnetic fields produced from the second opening.

53. (original): The method of claim 31, further comprising assessing an approximate location of the opening relative to a second opening in the formation by detecting one or more magnetic fields produced from the second opening with a magnetometer.

54. (original): The method of claim 31, further comprising assessing an approximate location of the opening relative to a second opening in the formation by detecting one or more magnetic fields produced from the second opening so that the opening is formed at an approximate desired distance from the second opening.

55. (original): The method of claim 31, further comprising pyrolyzing at least some hydrocarbons in the formation.

56. (original): The method of claim 31, further comprising controlling a pressure and a temperature in at least a part of the formation, wherein the pressure is controlled as a function of temperature, and/or the temperature is controlled as a function of pressure.

57. (original): The method of claim 31, further comprising producing a mixture from the formation, wherein the produced mixture comprises condensable hydrocarbons having an API gravity of at least about 25°.

58. (original): The method of claim 31, further comprising controlling a pressure in at least a part of the formation, wherein the controlled pressure is at least about 2.0 bars absolute.

59. (original): The method of claim 31, further comprising controlling formation conditions such that a produced mixture comprises a partial pressure of H_2 in the mixture greater than about 0.5 bars.

60. (original): The method of claim 31, further comprising altering a pressure in the formation to inhibit production of hydrocarbons from the formation having carbon numbers greater than about 25.

61. (original): The method of claim 31, further comprising heating at least a portion of the formation to a minimum pyrolysis temperature of about 270 °C.

62-1690. (cancelled)